Welcome students in today's session
we will be doing paper title Earth
dynamics and structural geology.
we will start with unit 1 module 1
earth as a planet : holistic understanding
of the earth.
Through the session we will do
The introduction
and we will discuss earth as a dynamic
planet .So in this we will be doing the
various subsystems
that make up the planet and how they
interact with one another.
By the end of this lecture you will be
able to explain
how geology is related to us and our
environment
and you will be able to explain earth as
a system
and its dynamic nature. To begin with
why do we study about the earth? Geology
is that discipline of science that
involves the study of planet Earth.
so why do we study about the earth first
of all
it provides us with natural resources, it
provides us with material that is
required for construction and
infrastructure development,
material like cement, bricks, asphalt,
gravel, steel and so on, It provides us
with fossil fuels
which is utilized for generating
electricity,
the metals that is used in the wires the
appliances,
the devices all of these are extracted
from geological processes. Apart from
these metal like gold,
iron, copper, they are very essential for
the country's economy.
Tthe next major aspect is the
understanding of natural disasters.
Natural disasters like volcanoes,
earthquakes,
tsunamis, droughts these are inevitable,
we cannot prevent them from happening,

but if we understand the nature of these processes,
we can certainly manage them
more effectively. The third major
aspect why we need to study about the earth
is the environmental issues the population
is ever rising and we need to provide
all the resources for us and our future generations.
This has resulted not only in depletion
of natural resources
but more severe problems like climate change and global warming.
Now regardless of what processes causes these changes,
we need to provide for our future.
we need to look for additional resources,
alternate resources and also work on the innovation front so as to recover
more efficiently and create less waste.
This in other words is referred to as
‘sustainable development’
and like i earlier said, to do this
we need to have a proper understanding
of our planet.
So before we go into the dynamic nature of our planet,
we need to understand the various subsystems
that are involved. Earth may be
considered as a single dynamic system
with many variables it is made up of subsystems
that are constantly interacting with one another.
The earth is made up of these four
subsystems the lithosphere,
the atmosphere, the biosphere and the hydrosphere.
The lithosphere: The lithosphere is the upper
shell of the planet earth it makes up
the crust and some part of the upper mantle.
This is referred to as lithospheric

plates.
The lithosphere is divided into various segments
and each of these plates move past another.
The movement of these plates has resulted in formation of mountain chains, closing and opening of oceans and so on.
The atmosphere : The atmosphere is the gaseous envelope that surrounds the earth
it contains of gases, water vapor, carbon dioxide,
and dust particles. It extends up to ten thousand kilometers
from the surface of the earth and based on its physical properties it is divided further
into more concentric layers. The biosphere consists of
life on this planet the flora, fauna and microorganism.
These flourish best in a particular set of temperature- pressure conditions that is referred to as the ecosystem.
The hydrosphere: The hydrosphere is all the
water content that is available on the land
partly below the land and in the atmosphere.
The main processes that operate here are precipitation,
condensation and evaporation. After rainfall
part of the water runs as surface runoff and is seen as rivers and streams. These join
the major water bodies like the oceans and seas
and then water evaporates from here after evaporation the water condenses to form clouds
and is again turned back in the form of rainfall or snowfall.
Now these four systems may appear as separate subsystems

but they are constantly interacting and
that is the result why we have such a
dynamic planet,
and that is the reason we cannot study
them in isolation.
For example the collision of
lithospheric plates will give rise to
formation of mountains
like the himalayas this has the
potential to alter
the hydrosphere and the atmosphere. The
rise of the mountain chain
may result changes in the rainfall
Pattern,
in the drainage pattern and this in turn
will
result in changes in the biosphere.
Now where the himalayas stand was once a
ocean
termed as the Tethys ocean. We also know
that fossils
shows us that life was prevalent in the
ocean
the ecosystem of a mountain and an ocean
is completely different.
However both did exist! This
tell us how one system changes
and accordingly the other system adapts.
In an another illustration consider the
movements of lithospheric plates which
result in volcanic activity.
The volcanic activity will give out
immense amount of pyroclastic materials,
lot of gases this may in turn alter the
atmosphere.
It may result in changes in the air
quality,
also result in changes in the water
quality,
This again can have effect on the
life that is prevalent in that area. And
third instance
the action in the biosphere especially
anthropogenic activities.
Human activities has resulted in
emission of carbon dioxide and other
greenhouse gases

that has resulted in the climate change.
This has affected the atmosphere the
hydrosphere
and even biosphere. For example the
result of global warming
is this rise in sea level which can
alter the
life that is prevalent in coastal areas.
So the point here is though the systems
appear as isolated systems,
they cannot be studied in isolation
and we have to have a holistic picture
of the earth,
if we need to understand the processes
that operate on it,
now and in the past. To summarize,
Geology is the discipline of science
that involves the study of planet earth.
Geology has significant role in mineral
resource exploration,
estimation and management and thereby
the economy.
It has a significant role in planning of
natural disaster management,
understanding of environmental issues
like climate change.
Earth is made up of four subsystems the
lithosphere,
atmosphere, hydrosphere and biosphere. The
complex interaction among the four
systems
result in dynamically changing planet in
which
matter and energy is continuously
recycled
into different forms.
These are the references.
Thank you.